Ecosystems: Terrestrial and Aquatic

5-2 Students will demonstrate an understanding of relationships among biotic and abiotic factors within terrestrial and aquatic ecosystems. (Life Science)

5-2.2 Summarize the composition of an ecosystem, considering both biotic factors (including populations, to the level of microorganisms, and communities) and abiotic factors.

Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st and 2nd grade, students explained how distinct environments of the world support different plants (1-2.5) or animals (2-2.3). In 3rd grade (3-2.3), students recalled the characteristics of a habitat that allowed organisms to survive there. In 4th grade (4-2.2), students explained how the characteristics of distinct environments influence the variety of organism there. In 7th grade (7-4), students will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environment.

It is essential for students to know that an *ecosystem* contains all of the organisms and their nonliving surrounding environment that contribute to the functioning of the ecosystem. An example of an ecosystem is an estuary, including all of the animals, plants, water, soil, air, and sunlight present and the interactions among them.

- The living parts of the ecosystem are called the *biotic factors* and include populations and communities of organisms.
- The nonliving parts of the ecosystem are called the *abiotic factors* and include the temperature, water, soil, air, and sunlight.

The living organisms in an environment can be grouped in two ways:

Population

- All members of one kind of organism that live in a particular area.
- Some examples of a population may be all of the white-tailed deer in a forest, all rainbow trout in a stream, or all of the bald cypress trees in the swamp.
- *Microorganisms* are living things that can be a single-celled or multi-celled organism that is too small to be seen without at least a 10x magnifier.

NOTE TO TEACHER: Students only need to know microorganisms as part of a community, not individual populations.

Communities

- A group of different populations of organisms.
- Some examples of communities are all of the squirrels, acorn trees, and grass in a park; all of the microorganisms in a pond; or all of the cacti, rattlesnakes, and scorpions in the desert.

It is not essential for students to know the types of microorganisms (paramecium, euglena, and amoeba).

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Assessment Guidelines:

The objective of this indicator is to *summarize* the composition of an ecosystem; therefore, the primary focus of assessment should be to generalize major points about the biotic and abiotic components of an ecosystem. However, appropriate assessments should also require students to *exemplify* or *illustrate* components of an ecosystem; *classify* parts of an ecosystem as biotic or abiotic; *identify* the organizational parts of an ecosystem; or *classify* organisms as populations or communities.